

SELECTED TOPICS In Aerospace Engineering

EDITOR

ERWIN SULAEMAN



IIUM Press

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
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Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

ISBN: 978-967-418-145-1

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN.BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan
Tel: **+603-6188 1542 / 44 / 45** Fax: **+603-6188 1543**
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ALTERNATE APPROXIMATE FUNCTION FOR KERNEL FUNCTION OF PLANAR OSCILLATING LIFTING SURFACES

23.1. Introduction

This chapter describes alternate procedure to evaluate incomplete cylindrical function occurring in the formulation of unsteady aerodynamic of multiple interfering lifting surfaces. The present numerical approach can be considered to be a complementary procedure to the analytical expansion series developed in the previous chapters. While the analytical expansion series is appropriate for a small argument of the incomplete cylindrical function, the present approach is suitable for evaluating such function with a moderate to large value of its argument.

23.2. Epstein's Approach

Epstein et al [12] presents a numerical approach for evaluating the incomplete cylindrical function B_I as follows

$$r^2 B_I = \int_{-|X/r|}^{\infty} \cos(kru) F(u) du + i \int_{-|X/r|}^{\infty} \sin(kru) F(u) du \quad (23.1)$$

where the function $F(u)$ is defined as

$$F(u) = \frac{1}{(1+u^2)^{3/2}} \quad (23.2)$$